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opportunities*

Stanley Klein, Publisher/Editor

TOP-OF-THE-WIRE

GE's Info Services Co. Becomes a True Believer

"We believe that the demand for the pictorial representation of data will be substantial in the 1980s." So exclaims Mike Chamberlain, general business products marketing manager at General Electric Information Services Co. Chamberlain made the projection when announcing GEISCO's sweeping new line-up of CG software: Harvard mapping programs (e.g., Symap, Calform, etc.), Tell-A-Graf, Disspla, SAS/Graph, Abt CG mapping and charting software, and GEISCO's own PLOT II, plus miscellaneous FORTRAN subroutines . . . all available via the GEISCO time share network.

"This represents the first time that GEISCO has gotten serious about computer graphics," admits Chamberlain; and "we are interested in adding still more CG software," he says. Contact: Mike Chamberlain, manager, general business products marketing, GE Information Services Co., 401 N. Washington St., Rockville, MD 20850. (301) 340-3628.

A Major Trend Unfolds: Users Want Color in CAD/CAM

Despite a price premium that runs to 30 percent, the CG user community is finding color capability in CAD/CAM worth the extra cost. That is the underlying message behind a little-publicized statistic revealed by Applicon, Inc. in government-required financial documents. The CAD/CAM company began marketing a seven-color terminal about one year ago, and now these Ramtek-based displays outsell all monochromatic varieties in a 60:40 ratio.

That number holds for shipments of complete turnkey systems as well as for add-on terminals alone, Applicon told the Harvard Newsletter. "Color will eventually dominate the CAD/CAM marketplace," exclaims Frank Gianattasio, product marketing manager at Applicon. "Color offers tremendous advantages to the design engineer."

However, even Applicon officials admit "surprise" at the extent of user commitment to color — "especially in mechanical CAD/CAM applica-

tions," admits one company officer. "Color is no longer just an expensive toy as many of us thought," continues this executive, who points out further that such terminals are not just being purchased as evaluation units. "We are selling three and four color terminals at a time," the executive said.

Color has always been recognized as a valuable capability in business graphics, and now the Applicon experience could seem to lay to rest the question of color's value in CAD/CAM applications. "It is a non-controversy," says Applicon's Gianattasio.

Whenever color comes into play, a companion question inevitably arises: What about color hard copy? "The market awaits something that offers reasonable price/performance," is the way Gianattasio answers this question. An engineering check plot now costs pennies per copy, he explains, versus \$5 or \$6 for a color hard copy photo. Says Gianattasio: "Color hard copy is definitely the next priority [R&D] area . . . We now know that the demand is there, even in CAD/CAM."

Defense Department Includes CG In Small Business R&D Awards Program

Some 100 contracts, each valued up to \$50,000, will be awarded to small business firms in a technology feasibility study program that encompasses computer graphics and control displays, human performance and productivity measurement, and lasers and photo-optics, among 20 topics altogether. "The program seeks to promote innovative solutions to important technical problems facing the defense community," explains Hal C. Felsher, DoD director of small business and economic utilization policy.

Phase I that is to determine the feasibility of a proposed technological concept or approach will be followed by Phase II R&D contracts which range to \$500,000. Phase III may then extend to production, Felsher says, adding: "Only Phase I

SPECIAL REPORT Computer Graphics In Accounting Page 4

Published TWICE-A-MONTH

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proposals, however, are to be considered at this time."

Among specific CG proposals sought:

- Low cost micros having graphic capability: Target cost is less than \$3,000, and the goal is to administer the Armed Service Vocational Aptitude Battery (test program) adaptively, on-line via computer.

- Personalized interactive display and analysis systems: The goal is to devise a display that accommodates people who differ in the type and level of information that they use and in how they organize it. Such displays are to permit complex decisions to be handled by a wide range of procedures — from global or intuitive at one extreme to detailed and analytical at the other.

- Innovative displays for military flight vehicles: The quest is for animated cockpit displays that, by providing the current and near future state of an aircraft, enable pilots to determine important flight information "at a glance."

Contractors retain rights to patents arising from this work, says Felsher. Due date for Phase I proposals is August 31, 1981, with the contracts to be awarded by year end and completion anticipated some six months later, namely June 1982. For details, write on letterhead to Hal Felsher, OUSDRE, Pentagon, Washington, DC 20301.

Where \$500 Buys 9,000 Frames Or One-sixth Of A Videodisc

Want to test a CG application on videodisc? New Media Graphics Corp. will make available as few as 9,000 frames or one-sixth of a shared videodisc for \$500 (5 minutes worth). This would be sufficient to examine how a CG application would appear on videodisc, the company says.

One rub is that each participant's portion is also distributed to the five other parties sharing the videodisc. The Cambridge (Mass.)-based company, however, says that, through disclosure, it will attempt to avoid improprieties and competitive conflict.

ACGC To Attempt A Public Offering . . . Again

Late last year, the potentially important new CG software and service supplier Abt Computer Graphics Corp. attempted to go public, without success. Then it tried again earlier this year, adding warrants as a sweetener to the original deal. But that did not fly either.

Undaunted, ACGC will now try once more to go public, this time with its sights set lower, aiming to raise \$3.75 million in lieu of the original \$5 million, offering two classes of warrants instead of just one, and at a stock price to range between \$5 and \$7.50 per unit vs. the original expectation of between \$11 and \$13 per share. Also, a new lead underwriter, Weinrich, Zitzmann, & Whitehead, Inc., headquartered in St. Louis replaces Moseley, Hallgarten, Estabrook & Weeden, Inc.

ACGC offerings include proprietary CG mapping, charting, and other graphics software, along with statistical and economic data bases available through ACGC's parent company Abt Associates

Inc. (HN - Mar. 9, '81). New customers of the start-up company, whose sales aggregate \$131,000 since inception and as of March 31, 1981, include the State of Minnesota and the General Electric Information Services Co.

ACGC software will also be marketed nationally by the Wellesley Hills (Mass.)-based Fowler, Anthony & Co., a sales rep organization that previously handled Disspla and Tell-A-Graf charting software by Integrated Systems Software Co. (ISSCO).

More Big Bucks Flow Into Image Processing

The imaging side of computer graphics is receiving capital attention these days, with DeAnza Systems, Interpretation Systems, and Spatial Data Systems among the acquisition targets this year alone (HN - July 6, '81). Now, a venture capital infusion flows to International Imaging Systems Inc. in Sunnyvale, Calif. The privately-owned, seven-year-old company, which bore the name Stanford Technology Corp. until February, posted a pre-tax operating income of \$1.4 million in 1980 on \$6.3 million in sales; sales in 1979 were \$2.8 million.

Lead investor in I²S, whose image-processing systems are employed in earth resources exploration, meteorology, non-destructive testing, automatic visual inspection, and medical diagnostics, is the venture subsidiary of electronic components manufacturer, Analog Devices Inc. (Norwood, Mass.), which put in \$3 million.

Also participating is a group headed by F. Eberstadt and Co., which anted up an additional \$1.5 million. Total proceeds will be used for working capital and to buy back stock from a major shareholder; how much goes for which purpose was not disclosed. Through stock option provisions in the agreement, by 1986, Analog Devices could wind up owning 100 percent of I²S.

Computerized Pictorial Typesetting Is Subject Of A Three-Day Conference

A sleeper CG application field — computerized pictorial typesetting — is the subject of a conference to be held Aug. 9-11, 1981, in Andover, Mass. Conference sponsor is the Institute for Graphic Communication, Inc., that explains: "Recent developments that integrate text and illustration have revolutionary implications for commercial and in-house publishing."

The conference covers integrated (text, illustration) systems, software availability, electronic publishing, plus full color image processing in addition to line drawing applications.

Conference chairman, Dr. Michael P. Barnett, is a computer and information science professor at Brooklyn college; other lecturers come from Bell Labs, Xerox Corp., and U.S. News and World Report, etc. Fee: \$550. Contact: Elaine O'Mara, Conference Registrar, Institute for Graphic Communications, Inc., 375 Commonwealth Ave., Boston, MA 02115. (617) 267-9425.

HARDWARE

A Frame-By-Frame Recorder Merges CG And Videotape

From the company who won a "technical achievement" movie Oscar comes a new color video animation system that enables frame-by-frame recording and playback of computer-generated graphics and images onto videotape at 24 or 30 frames per second. Its advantages over film animation: Immediate playback, instant editing of frames, color correction, and easier dubbing, according to Bruce Lyon, whose company Lyon Lamb, introduced the Oscar-winning frame-by-frame, black-and-white videotape recorder in 1979.

"The new system is generating strong interest among CG animation workers in the earth sciences, defense, and education," Lyon claims. Lyon's video animation system, abbreviated VAS IV, interfaces with Ampex one-inch type "C" video formats and JVC or Sony three-quarter-inch U-matic professional video cassette recorders. VAS IV accepts any NTSC input from either a graphics terminal or video camera and has an RS 232 interface.

A VAS IV turnkey system (34-inch format) costs about \$27,000; an animation controller alone, \$15,000. Contact: Bruce Lyon, Lyon Lamb Video Animation System, 8255 Beverly Blvd., Los Angeles, CA 90048. (213) 655-0606.

New CG Terminal Is HP's Lowest Cost Yet

Hewlett-Packard unveils its lowest-priced graphics terminal yet, the monochromatic HP2623A, featuring 512 x 390 resolution, independent graphic and alphanumeric memories, and text composition supported in eight different languages (English, Swedish, Finnish, Norwegian, Danish, French, German and Spanish). Price: \$3,750 (U.S.); options include an integral thermal printer, \$1,210; line-drawing character set, \$105; and six national language and keyboard options, \$105 each. Contact: Gary F. Chesnutis, HP, 1501 Page Mill Rd., Palo Alto, CA 94504.

Video Display Controller

Matrox Electronic Systems Ltd. introduces the user-programmable RGB-GRAPH, a 512 x 512 by 4 bit, single board color graphics video display controller having zoom, shift, pan, scroll, clear, clip, mask and overlay capabilities. An add-on board (VAF-512), containing a 512 x 512 x 8 real time frame grabber, 16 million color look-up table, and a high-speed (700nsec/pixel) hardware vector generator for the RGB-GRAPH, will be available in late 1981. Contact: Gerry Sullivan, Matrox Electronic Systems Ltd., 5800 Andover Avenue, T.M.R., Montreal, Quebec, Canada H4T 1H4. (514) 735-1182.

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David Luther leaves Imlac to become graphics product marketing manager at Lexidata Corp.

PUBLICATIONS

Eight Volumes Added To Harvard CG Library

The Harvard Univ. Laboratory for Computer Graphics publishes eight additional CG volumes, thereby bringing its computer graphics library collection to 19 volumes in all. Each volume employs a central theme, based on papers presented at past Harvard Computer Graphics Weeks.

Among the new volumes:

- Management's Use of Graphics
- Cartographic Data Bases and Software
- Computer Graphics Hardware
- Computer Mapping of Natural Resources and the Environment
- Computer Mapping Applications in Government Plus CG in Education
- How to Design an Effective Graphics Presentation

Also included is a two-volume bibliography and index. Price on the new eight-volume set is \$165; for all 19 volumes, \$300. Individual volumes may be purchased separately. Contact: Karen Smolens, CMR, 850 Boylston St., Chestnut Hill, MA 02167.

Conrac Publishes A Raster CG Handbook

CRT monitor maker Conrac Corp. publishes a raster graphics handbook "intended for engineers who integrate CG display hardware into CAD/CAM, process control, and other digital systems." The paperbound, pocket-size book covers CRT displays per se, accessories and peripherals, graphics controllers, monitor interface and selection, and the human interface. Price: \$20. Contact: Gene Ornstead, Conrac Div., Conrac Corp., 600 N. Rimsdale Ave., Covina, CA 91722. (213) 966-3511.

Computer-Assisted Make-up and Imaging Systems (CAMIS): Technology and Assessment. This volume is the offshoot of work conducted at the Program on Policy Studies in Science and Technology at George Washington Univ. (Washington, D.C.). By Henry B. Freedman, et al., it not only covers the way electronics is making inroads into the graphic arts but also delves into people-oriented aspects — unemployment, job skill requirements, copyright erosion, and privacy invasion. Price: \$45. Contact: Henry B. Freedman, Policy Studies Reports, P.O. Box 2413, Springfield, VA 22152.

U.S. Directory of (Turnkey CAD/CAM) Vendors. This 156-page book is the final volume in a three-part survey and buyers guide which focuses on mechanical CAD/CAM. The earlier volumes cover CAD/CAM technology and turnkey systems evaluations. (HN - Aug. 29, 1980.) This recently-issued volume contains information on vendor sales, personnel, ownership, products and services, among other data. It also contains market data by vendor. Price on the directory alone: \$99; all three volumes: \$295. Contact: Charles M. Foundyller, Daratech Associates, P.O. Box 410, Cambridge, MA 02238.

SPECIAL REPORT

Jarett's Plan: Computer Graphics In Accounting

This CPA Has Pioneered A Set of Standards For Presenting Profit & Loss & Balance Sheet Data . . . Graphically.

By Stanley Klein, Publisher/Editor

Yet another innovative effort is underway at Digital Equipment Corp. No, not necessarily a new computer, rather a pioneering approach for working with data. Tabular financial information is undergoing a conversion to computer-generated graphic format for use by DEC's 12-man operating committee. Also, at the product level — specifically at DEC's Commercial Services Product Group in Merrimack (New Hampshire) — new graphic formats are to be tried in budget, planning, and other related exercises.

The prime mover behind such experimentation in data formatting is Dr. Irwin M. Jarett, a DEC consultant on CG applied to accounting and other financial data. Jarett, however, is more than a hired professional; he is a man with a vision — and a mission: He wants computer-generated graphics to become the standard way to present profit and loss, balance sheet, and other accounting data.

Why The Computer

Says Jarett: "The approach offers accountants, financial officers, and management in general the potential to achieve unprecedented data manipulation and interpretation ability." The computer comes into play, Jarett maintains, because it facilitates graphics creation and makes the concept workable and economically feasible. Without the computer, he continues, graphics requires a special effort and often a graphics designer to prepare.

Accountants and other financial specialists, however, are accustomed to tabular presentations, and even typewriters and bookkeeping equipment are designed to accommodate this traditional approach. Education and retraining of an entire profession may be what is eventually at stake.

Jarett's credentials appear impeccable for taking on the task to trigger such profound change. He is a user of financial data, both as a CPA (Certified Public Accountant) and professor of medical economics at Southern Illinois University's School of Medicine.

Jarett is also a CG guru; he heads a CPA firm bearing his own name that implements financial computer graphics systems for clients in industry, retailing, and health care. "Once my clients get a taste of financial graphics, they clamour for more analyses to be presented in this fashion," says Jarett, who tacks on an additional \$120-a-month fee, beyond his regular charges to do this financial graphics work.

Beyond such proprietary business interests,

Jarett has embarked on another more professional role that ranks him as a true crusader. He, personally, has developed a carefully constructed set of financial graphic standards, based on horizontal bar formats, along with predetermined rules, concerning scale, axes, labeling, footnotes, and so on. With this preliminary work now done, Jarett is campaigning to win backing, not necessarily for his specific standards per se, but for his ideas. Among his activities:

- Public speech making and article writing, aimed at both the CG community and the users of financial data, especially the American Institute of Certified Public Accountants.
- Research undertakings, including a push to set up a nonprofit institute.
- Continued hardware/software CG development efforts.

Wooling The Accountants

Jarett's most immediate pressing issue is whether the American Institute of CPAs will form a committee to evaluate the merits of his proposals. That consideration results from a major address Jarett gave in June before the AICPA in Orlando, Florida. Also, his article, *Computer Graphics: A Reporting Revolution?* appears in the *Journal of Accountancy* (May, 1981).

At Harvard Computer Graphics Week - '81, Jarett will present a paper on how graphics facilitates the use and interpretation of international financial data. "Financial statements, when reduced to graphics," he says, "convey identical meanings whether reported in dollars, yens, pounds, lira, or whatever."

During the same conference, his son, Alex, will report on research that he and others conducted at the univ. of Texas (Austin), whereby graphics presentations enabled MBA students to identify companies that went bankrupt more readily than when the same data was presented in numerical format. "Pattern recognition is one of the most powerful abilities that humans have to detect changes from a norm," Jarett sums up.

Nix On Color

Also, at the Harvard Conference, Jarett will expound his findings on the use of color in accounting graphics. In brief, Jarett opposes color graphs, at least for now. Why? For one, color blindness affects one out of ten males in the U.S. For another, the need to replicate color exactly to conform to a standard will result in significant extra expense. "The demand for color [among management]," he reports "drops rapidly once the understanding of the graphic patterns — and the power of pattern recognition — becomes clear." Color will eventually play a significant role, however, Jarett adds, namely in icons that depict the line items in financial statements. "This will happen by 1990," Jarett predicts.

Jarett's proposed standards, therefore, are based on black and gray shadings in the horizontal bars. For example, a solid black bar is always used to show current year results. Bars that show comparative data are shaded, and shown one behind the other, each in a lighter gray scale to render a 3-D impression. Subset bars are used to depict subcategories (added or subtracted items), with each subset bar starting where a previous one ended. (See end of article on how to get more detail.)

What An Institute Would Do

It is research to confirm or disprove such concepts and theses that is to be underwritten — or undertaken — by Jarett's proposed nonprofit research institute. Such an organization, which Jarett has already named The Playfair Institute after a pioneer worker in the graphics field, would extend Jarett's work beyond that of a one-man show; and it would investigate the larger question: How may financial graphics best be applied to maximize executive productivity?

Advanced studies would be undertaken, such as the use of computer animation to present financial information dynamically, the merits of 3-D presentations, and so on, as well as the more immediate questions concerning color and format selection and other human factor considerations. "Different colors mean different things to different people," he says. Currently, Jarett seeks to pull together a board of directors, obtain funding, and locate his institute at some university or other appropriate nonprofit setting. His goal is to initiate objective research. Jarett even suggests privately that maybe computer graphics does not deliver cost benefits in financial data applications, though he does not really believe this to be the case, of course.

Another need, more nitty-gritty and technical in nature, is to optimize computer equipment and software to produce financial graphics. Jarett's 2½-year-old firm has already configured a basic system. It comprises DEC's new GIGI graphics terminal, two-5M byte hard disc drives, 28K of RAM memory, and a plotter. This fall, Jarett's firm will release Version 1 of a general ledger-oriented graphic system report writer; a follow-up version in early 1982 will have a data base linkage, and yet a third enhancement, to become available next summer, will contain mapping and other features.

Avoiding A Pitfall

"The goal," Jarett says, "is to generate routine reports using existing data bases." Finally, Jarett has teamed up with California-based Iconix, formerly the Zytron Div. of National CSS, to develop graphic formats and software, customized to how specific industries measure financial performance.

All of this, however, may be viewed as detail when compared to the larger need to win professional support for graphic standards in accounting, especially the profit and loss and balance sheet statements per se. "Graphics should meet accounting requirements for fairness," Jarett maintains. Prompting that remark is Jarett's awareness that graphics — whether computer-generated

or not — can be ill used, subject to misinterpretation, and otherwise distorted. Indeed, for these reasons, accountants and other financial experts prefer their data presented as raw numbers in tabular format.

That is why Jarett is adamant: "Graphics formats must not portray optimistic or pessimistic results; nor must they highlight or combine and make invisible selected data," he declares. "Each graphic presentation should directly reflect its tabular financial counterpart." At stake is nothing less than Jarett seeing his vision becoming a reality.

FOR MORE INFORMATION

An information kit containing the proposed standards, illustrative bar graphs, and article reprint from The Journal of Accountancy is available to Harvard Newsletter subscribers directly from: Dr. Irwin M. Jarett, C.P.A., Ltd., 960 Clock Tower Dr., Suite G, Springfield, IL 62705

APPLICATIONS

Air Traffic Control In Florida Is First To Use Color Displays

As yet another indication of color CG's increasing importance, the U.S. Navy becomes the first to use color graphic displays in air traffic control. The system installed at the Fleet Area Control and Surveillance Facility in Jacksonville, Fla., monitors aircraft and ships during naval exercises, incorporating data from Federal Aeronautics Administration and Air Force radars as well as the Navy's own tactical data system.

The display segments weather data, targets, aircraft data, and schedule information not only by one of four colors but also by various intensity levels. This leads to significant operations improvements, says Sanders Associates, Inc., whose beam penetration Color Indicator is the 4-color display employed (HN - Feb. 8, 1980).

Other system features include display area selection that can range anywhere from 4 to 512 nautical miles, zoom capability, display of five computer-stored maps, and the ability to draw custom maps, among other capabilities. Underway also is a 12-display ATC system at the Navy's Virginia Cape site and a 16-display system in San Diego, with the likelihood of yet another system implementation in Hawaii.

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Systems Engineering Laboratories signs a licensing agreement with Megatek Corp. to use its Template general-purpose CG software in the SEL minicomputer product line. (HN - Aug. 15, 1980.)

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Digital Engineering Inc. (Sacramento, CA) adds a light-pen accessory and printer interface option to its Retro-Graphics electronics Package that imparts graphics capability to the Digital Equipment Corp. VT100 alphanumeric terminal. (HN-Oct. 25, '80). Light pen price: \$360; printer interface, \$140, both to be added to the \$3,500 price on the conversion hardware.

CALENDAR

CG Becomes A Major Thrust At The Univ. of Missouri

Recently, the Univ. of Missouri-Rolla spent \$1.5 million on an IBM 4341 dedicated to CG applications, along with 24 Tektronix 4014s, each equipped with a graphic tablet, and six hard-copy devices. Now, the Midwestern university launches a major series of two-day CG seminars to be held in three states and topped off by a national CG conference on April 1-2, 1982.

"We want to get into the [computer graphics] mainstream," is the way Prof. Ralph E. Lee states the university's interest in the field. The seminar series will be headed by Lee, director of computer science continuing education and computer science professor; Lee's CG experience dates back ten years in the planning, selection, acquisition, and implementation of CG systems.

Seminar topics cover introductory CG, business graphics, microcomputer-based graphics, turnkey graphic systems, and robotics. Site locations will be in St. Louis (Missouri), Phoenix (Arizona), and Orlando (Florida), starting Oct. 1-2, 1981, and held periodically through April 1982. Attendance fee, \$195 or \$295 each, depending on CG topic; robotics, \$375.

Then, on April 1-2, 1982, the University will hold a national conference on its campus. The emphasis will be on CG in educational curricula, says Lee. The conference will include CG demonstrations and invited papers. For details, contact Prof. Ralph E. Lee, Continuing Education Dept., 105AH/SS Univ. of Missouri, Rolla, MO 65401. (314) 341-4866.

CAD/CAM Conferences To Be Held In Israel, England, and U.S.

Forth Worth (Texas) and Cambridge (Mass.) in the U.S., Tel Aviv in Israel, and Sussex, England, are to be the sites for an array of CAD/CAM conferences, all potentially of keen interest to a major portion of the CG user community.

Starting with the earliest event, the week-long CAD/CAM Graphics Expo will be held Oct. 27-30 in Fort Worth (Texas) in conjunction with the 10th annual meeting of the Computer-Aided Manufacturing International, Inc., (CAM-I). Registration fee: \$295; for CAM-I members, \$195. Contact: Robert Waterbury, 611 Ryan Plaza Dr., Suite 1107, Arlington, TX 76011. (817) 265-5328.

Next to come along is the 3rd Israel Conference and Exhibition on CAD/CAM to be held Dec. 29-30 in Tel Aviv. Sponsored by the Israel CAD/CAM Society, the conference will present papers in Hebrew or English and will include a film and slide show, CAD/CAM equipment and services exhibit, plus an introductory one-day CAD/CAM tutorial. Contact: P. Yedlin, Conference Organizer, Israel Society for CAD/CAM, c/o Computing Center, Ben Gurion Univ., P.O. Box 653, Beer Sheva 84120, Israel. (057) 64313.

Then some three months later in March 24-26 comes another conference, this one on CAD/CAM in mechanical engineering and sponsored by MIT in Cambridge (Mass.) as a sequel to a 1978 CAD/CAM conference. Contact: Prof. David C. Gossard, Mechanical Engineering Dept., MIT, Cambridge, MA 02139. (617) 253-4465.

Finally, the English Journal *Computer-Aided Design* holds its 5th International Conference and Exhibition on computers in design engineering (CAD 82) on Mar. 30 - Apr. 1, 1982, in Sussex, U.K. Contact: Alan Pipes, conference organizer, CAD 82, IPC Science and Technology Press Ltd., P.O. Box 63, Westbury House, Bury St., Guildford GU2 5BH, Surrey, England. 0483 31261.

ISSCO Sets Business CG Seminars

A series of business CG seminars, each a half-day long, highlighting DISSPLA and TELL-A-GRAF software, will be held throughout the country by the developer of the software, Integrated Software Systems Corp. Fee: \$75. For West Coast and Midwest seminars, contact: Peter Preuss, Pres., ISSCO, 4186 Sorrento Valley Blvd., San Diego, CA 92121. (714) 452-0170. For East Coast seminar information, contact: Alan Paller, Pres., AUI Data Graphics, 1701 K St., N.W., 3rd Fl., Washington, D.C. 20006 (202) 331-1800.

Digital Imaging Courses at GWU

The following week-long digital imaging courses are sponsored by George Washington Univ. in Washington, D.C. Contact: Continuing Engineering Education, George Washington Univ., Washington, D.C. 20052. (202) 676-6106. (800) 424-9773.

Mapping From Space: Techniques and Applications (Aug. 31-Sept. 3) Fee: \$645.

Remote Sensing for Global Resource Applications (Oct. 19-23) Fee: \$715

Digital Image Processing of Earth Observation Sensor Data (Oct. 26-30) Fee: \$715

Modern Computers In Mechanical Design.

A two-day seminar series, sponsored by Digital Equipment Corp.; chaired by Dr. Harry Schaeffer, President, Schaeffer Analysis, Inc. Covers mechanical CAD techniques and alternatives, CAD system implementation, and personnel planning. Fee: \$595. July 30-31 (Los Angeles); Aug. 27-28 (Chicago); Aug. 31-Sept. 1 (Detroit); Oct. 6-7 (Boston); Nov. 2-3 (Dallas); Nov. 5-6 (Houston). Contact: Educational Programs Manager, Engineering Systems Group, MR1-1/M75, Digital Equipment Corp., 200 Forest St., Marlboro, MA 01752.

Remote Sensing of Arid and Semi-Arid Lands.

Jointly sponsored by the Environmental Research Institute of Michigan and the Remote Sensing Center of the Egyptian Academy of Scientific Research and Technology. Nov. 3-9, 1981 (Cairo, Egypt). Registration fee: \$155 prior to Oct. 1; \$185 thereafter. Contact: Remote Sensing Center, ERIM, P.O. Box 8618, Ann Arbor, MI 48107. Or Elbrahim El-Kassas, Academy of Scientific Research and Technology, Remote Sensing Center, 101 Kasr El Eini St., Cairo, Egypt.

BUSINESS & FINANCIAL

Dicomed Corp. Moves To Establish U.S. Dealerships, Foreign Sales Reps

A market expansion is underway on two fronts at graphics COM vendor Dicomed Corp. With direct sales to foreign customers accounting for 10 percent of total sales in 1980 versus but one percent in 1979 and 1978, the Minneapolis (Minn.)-based company moves to set up a foreign sales representative network in Europe, Australia, and Japan. In addition, Dicomed moves heavily into the graphic arts, offering its Dicomed slide-making systems to independently-owned and -operated slide service bureaus; four dealerships, covering eight cities in the U.S. and Canada, are already signed up.

DEC and SDRC Enter Pact

Independent CAD/CAM software firms Manufacturing and Consulting Service, Prototype Development Associates and Scientific Calculations all enjoy a special leverage among users: joint market agreements with Digital Equipment Corp.'s Engineering Systems Group in Marlboro, MA (HN-Jan. 25, '80).

Now, to this favored list add Structural Dynamics Research Corp. (SDRC) in Cincinnati, Ohio, developer of some 70 mechanical CAD/CAM software packages, for whom DEC will also publicize, advertise, and promote sales via its salesmen and market literature. Among SDRC packages that run on VAX systems:

- IMP 3-D kinematics program for design and analysis
 - Fatigue and Modal-Plus mechanical testing programs that perform system simulation under dynamic loading
 - Hi-Pro used in sheet metal fabrication.
- SDRC also offers VAX-based pre- and post-

processors for finite element analysis. Contact: James Morrison, Marketing Manager, Structural Engineering, Engineering Systems Group, Digital Engineering Corp., Marlboro, MA 01752. (617) 467-5159.

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Filter manufacturer Pall Corp. awards Graphics Technology Corp. in Boulder, Colo., a \$1 million contract to install a distributed CAD/CAM system at three remote Florida locations. Recently, one-year-old GTC received a \$4 million capital infusion to support its market entry into mechanical CAD/CAM. (HN - Apr. 13/27, '81.)

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Overseas customers account for 30 percent of Applicon revenues in its latest fiscal year, ended Apr. 30, compared to only 18 percent for the prior year. Says the company: "Western Europe will be an increasingly important CAD/CAM market."

PEOPLE

Calma Appointments

The Calma Co. subs. of General Electric Co. appoints 15-year G.E. management-veteran Thomas A. Tomasetti to the position of VP and general manager in Calma's Mechanical Div. At the same time, Jeffrey M. Lane, formerly a Boeing Co. CG senior engineer and research specialist, becomes manager of advanced product development, also in Calma's Mechanical Products Div.

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Image processing systems vendor Scitex Corp. names Paul L. Rosenbaum, formerly a VP at the Codex Corp. subs. of Motorola, Inc., to the position of President, Scitex America Corp., a wholly-owned Bedford (MA)-based subsidiary of Scitex Corporation Ltd. in Israel.

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Lawrence M. Martin becomes marketing director at graphics COM vendor Dicomed Corp.

STATEMENT OF PURPOSE

The *Harvard Newsletter on Computer Graphics* provides readable, timely, and penetrating reports, analyses, and interpretation of significant developments in computer graphics of interest to both current and potential users and vendors. Computer graphics as covered by the Newsletter embraces engineering design, cartography, business and statistical graphics, image processing, animation, and related disciplines. The focus of the Newsletter reports may be on a product, company, technology, user, industry leader, market or business development. By spending 10 to 15 minutes or so with each issue, a subscriber should be able to acquire a comprehensive awareness of key developments in computer graphics that have transpired over each publishing cycle with an understanding of longer-term significant trends as well.

The Newsletter, published by Harvard University . . . under the auspices of the Laboratory for Computer Graphics, uses a unique team approach, combining journalistic and professional expertise. The Laboratory's professional work in computer graphics dates back more than 15 years, while its publisher and editorial director, Stanley Klein, offers similar publication experience, as a key editorial staff member at *Machine Design* and *Business Week* magazines and, most recently, as editor-in-chief of *Mint-Micro Systems* and *Computer Systems News*.

ODDS & ENDS

Newsletter Index Depicts CG Developments, Suppliers

A set of two, computer-massaged indexes, one arranged by subject, the other by company (organization), and covering volumes one and two of this Newsletter, will be available for delivery this summer, according to Stanley Klein, Newsletter publisher/editor.

"Now, the Newsletter can better do one of the jobs intended for it from the start—namely serve as a research tool," says Klein, who, along with the Harvard Lab for Computer Graphics, founded the Newsletter as the only specialized CG publication to appear twice-a-month. "By making information easy to track down," Klein says, "the Newsletter can now be used as an archival resource as well as a timely news source."

"This should make Newsletter back issues indispensable to researchers, entrepreneurs, marketing people, and CG professionals of all kinds and especially for newcomers to the CG field," he adds. The 8 1/2 x 11 in. size index comes in two parts:

(1) A 16-page subject index, comprised of 80 major headings that range from "Acquisitions and Mergers" to "Voice Recognition" plus "CAD/CAM" and "Business Graphics."

(2) A 21-page company, or organizational index, comprised of 323 listings, ranging from Abt Computer Graphics to Zytron Corp., but also including the likes of Hewlett Packard, Computervision and IBM.

In both indexes, each major entry contains the story title as well as issue date, page number, and even the column. "By looking up certain companies one can learn the history of its CG activities in a quick reading," Klein notes. "Or, conversely, the listings under a subject heading identify what has become available or happened during the index'

time frame."

The index' first edition covers 1979 (Volume 1) when the Newsletter began, through Dec. 1980 (Volume 2). "Follow-up indexes will be published," adds Klein.

Price on the 16-page subject index: \$21 (plus \$3 outside the U.S./Canada/Mexico); for the 21-page company index, \$26 (plus \$3 postage outside U.S./Canada/Mexico). Both bought simultaneously as a single order costs \$39 (plus \$5 outside U.S./Canada/Mexico).

Back issues covering the two volumes are also available and cost \$150 *including both indexes*. Make checks payable to Harvard Univ. Contact: The Harvard Newsletter on Computer Graphics, Index Dept., 730 Boston Post Rd., P.O. Box 89, Sudbury, MA 01776.

Bringing CAD and CAM Together Via Data Communications Links

To perform postprocessing functions that convert toolpath designs developed on Calma CAD/CAM systems to actual machine tool instructions is the goal of communications links to be established between Calma and the General Electric Information Services Organization (GEISCO) and between Calma and Manufacturing Data Systems, Inc. (MDSI). GEISCO will offer Calma users access to APT parts programming software, while MDSI will enable Calma users to transfer tool motion statements to MDSI's Compact II, another widely-used non-graphic parts programming language. Contact: Donald K. Grierson, Calma, 5155 Old Ironsides, Santa Clara, Calif. 95050. (408) 727-0121.

★ ★ ★ ★ ★

Hewlett-Packard to begin offering AD-2000S CAD/CAM software from Manufacturing and Consulting Services, Inc. to run on H-P model 1000 16-bit computers, the first such mini-computer implementation, as previously reported (HN - Mar. 9, '81).

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